CLAIMS

1. A fuel cell comprising:

a proton conductor film layer having a surface comprising a material capable of conducting protons; and

a catalyst layer having a metal component wherein the catalyst layer is formed on the surface of the proton conductor film layer.

2. The fuel cell according to Claim 1 wherein the metal component is selected from the group consisting of platinum, palladium, iridium, rhodium, alloys thereof and combinations thereof.

3. The fuel cell according to Claim 1 wherein the catalyst layer comprises one or more ventilation openings.

4. The fuel cell according to Claim 1 wherein the proton conductor film layer has a thermal resistance.

5. The fuel cell according to Claim 1 wherein the proton conductor film layer comprises a carbonaceous material substantially composed of carbon defining a matrix structure and one or more proton dissociative groups introduced therein.

6. The fuel cell according to Claim 1 wherein the catalyst layer is formed on a pair of opposite facing surfaces of the proton conductor film layer.

7. A method of preparing a fuel cell including a proton conductor film layer comprising the steps of:

providing the proton conductor film layer having a surface and including a material capable of conducting protons; and

forming a catalyst layer having a metal component on at least a portion of the surface of the proton conductor film layer.

8. The method according to Claim 7 wherein the step of forming the catalyst layer includes forming the catalyst layer by any one of a sputtering process, a vacuum deposition process and a chemical vapor deposition process.

9. The method according to Claim 7 comprising the steps of adding a plurality of fine particles of a material different than the metal component to the surface of the proton conductor film layer prior to forming the catalyst layer thereon; and removing the fine particles subsequent to forming the catalyst layer to form one or more ventilation openings.

10. The method according to Claim 9 wherein the fine particles have a particle size that is greater than a thickness of the catalyst layer.

11. The method according to Claim 9 wherein the fine particles are composed of silica.

12. The method according to Claim 11 wherein the step of removing the fine particles includes removing the fine particles from the proton conductor film layer by any one of an ion milling process and an etching process employing at least one of a fluorine-containing solution and a fluorine-containing gas.

13. The method according to Claim 7 wherein the fine particles comprise tin oxide.

14. The method according to Claim 13 wherein the step of removing the fine particles includes removing the fine particles from the proton conductor film layer by any one of an ion milling process and an etching process employing at least one of a fluorine-containing solution and a fluorine-containing gas.